



## INSTRUCTIONAL MATERIALS ADMINISTRATOR

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### Recommendation

Yes

**Comments:** In the publisher provided standard correlation there are some standards that the publisher did not provide a citation of the major tool however, I was able to find many instances where students would indeed master a standard such a 5.02 and 22.07- centrifugation explanations support these standards

**Notation:** may be appropriate for M/J Life Science 2000025

### Material for Review

**Course:** Industrial Biotechnology (8736000)

**Title:** Biotechnology: Science for the New Millennium , Edition: 1E REVISED

**Copyright:** 2012

**Author:** Ellyn Daugherty

**Grade Level:** 9 - 12

### Content

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- 5 - VERY GOOD ALIGNMENT
- 4 - GOOD ALIGNMENT
- 3 - FAIR ALIGNMENT
- 2 - POOR ALIGNMENT
- 1 - VERY POOR/NO ALIGNMENT

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- Additional information regarding the Content, Presentation, and Learning requirements are located in the Career and Technical Education Specifications for the 2015-16 Florida State Adoption of Instructional Materials.

Each set of materials submitted for adoption is evaluated based on each benchmark for that course and the Content, Presentation, and Learning items included in this rubric.

**A. Alignment with curriculum** 1. A. The content aligns with the state's standards and benchmarks for subject, grade level and learning outcomes.

VERY GOOD ALIGNMENT    **GOOD ALIGNMENT**    FAIR ALIGNMENT    POOR ALIGNMENT    VERY POOR/NO ALIGNMENT

Justification:

There are some standards that are only addressed in the lab manual with minimal connections in the student text. This is especially the case in many of the safety-related standards such as 15.01, 15.02, 15.06, 15.08

2. A. The content is written to the correct skill level of the standards and benchmarks in the course.

VERY GOOD ALIGNMENT    **GOOD ALIGNMENT**    FAIR ALIGNMENT    POOR ALIGNMENT    VERY POOR/NO ALIGNMENT

Justification:

In some cases, the topics are related to the standards but do not go to the depth of the standard. For example, the material of standard is related to the standard 4.03 but does not meet the standards such as p.p.18-23 presents experiential design related to hypothesis but does not offer enough material for the student to understand disproving of theories or differentiate between theories and laws.

3. A. The materials are adaptable and useful for classroom instruction.

**VERY GOOD ALIGNMENT**    GOOD ALIGNMENT    FAIR ALIGNMENT    POOR ALIGNMENT    VERY POOR/NO ALIGNMENT

Justification:

Teacher course planner, with guidelines for structuring course and lesson models, and assessment resources. A CD can serve as a lab tutor with a narrated glossary and image bank and instructional video clip. The lab manual with activities and experiments includes required documentation to design and analyze data and formulate results.

**B. Level of Treatment** 4. B. The materials provide sufficient details for students to understand the significance of topics and events.

VERY GOOD ALIGNMENT    GOOD ALIGNMENT    **FAIR ALIGNMENT**    POOR ALIGNMENT    VERY POOR/NO ALIGNMENT

Justification:

Overall, the level of details for topics are good however there is a significant gap in chemistry. The student text is limited in content at the molecular level- standards 5.02, 5.03, 5.04, 5.05, instruction may need to be supported with additional material related to understanding chemistry necessary for students to understand how PCR results and molecular movement occurs in DNA sequencing

5. B. The level (complexity or difficulty) of the treatment of content matches the standards.

VERY GOOD ALIGNMENT    **GOOD ALIGNMENT**    FAIR ALIGNMENT    POOR ALIGNMENT    VERY POOR/NO ALIGNMENT

Justification:

A strength of the written in text is in many cases when a complex content is presented the author embeds common language in the statements. see lab manual: p.p. 62 & 63 "calculations and "media prep" . This approach keeps the complexity of the content high while making it understandable to the reader

6. B. The level (complexity or difficulty) of the treatment of content matches the student abilities and grade level.

**VERY GOOD ALIGNMENT**    GOOD ALIGNMENT    FAIR ALIGNMENT    POOR ALIGNMENT    VERY POOR/NO ALIGNMENT

Justification:

A strength of the text presentation is the ample integrated real world examples. Complex content is supported with a variety of pictures and detailed connections. The examples and connection to the content make it accessible for students at varying reading levels and with varying backgrounds.

7. B. The level (complexity or difficulty) of the treatment of content matches the time period allowed for teaching.

**VERY GOOD ALIGNMENT**    GOOD ALIGNMENT    FAIR ALIGNMENT    POOR ALIGNMENT    VERY POOR/NO ALIGNMENT

Justification:

The publisher offers that the material fits a one academic year course however with the extension activities for each topic ( for example see: p.p. 336-337- Activity 11.1, 11.2, 11.3), teachers can pace the curriculum in a variety of ways serving advanced and traditional students within a year or could be condensed into a half-year semester long course.

**C. Expertise for Content Development** 8. C. The primary and secondary sources cited in the materials reflect expert information for the subject.

**VERY GOOD ALIGNMENT**    GOOD ALIGNMENT    FAIR ALIGNMENT    POOR ALIGNMENT    VERY POOR/NO ALIGNMENT

Justification:

The content in both the student text and the lab manual is strongly correlated to national, international and some cited state as well as private organizations. The majority of protocols and definitions of terms are correlated to current manufacturing, business and industry standards.

9. C. The primary and secondary sources contribute to the quality of the content in the materials.

**VERY GOOD ALIGNMENT**    GOOD ALIGNMENT    FAIR ALIGNMENT    POOR ALIGNMENT    VERY POOR/NO ALIGNMENT

Justification:

In the student text, each topic supported with genetic and cited specific brand products-for example see: 346-347. The integration of common brand names with scientific/research names is a strength of the delivery (especially difficult content) and offers a broad snapshot of the context within the biotech industry in which the content would be used.

**D. Accuracy of Content** 10. D. The content is presented accurately. (Material should be devoid of typographical or visual errors).

VERY GOOD ALIGNMENT    **GOOD ALIGNMENT**    FAIR ALIGNMENT    POOR ALIGNMENT    VERY POOR/NO ALIGNMENT

Justification:

In a few cases, italic font is missing for scientific names and I question the use of capitalization of some brand names/corporations \* for example, p. 382 activity 12.3 American Cancer Society Web site - web should not be capital in two places on page.

11. D. The content of the material is presented objectively. (Material should be free of bias and contradictions and is noninflammatory in nature).

VERY GOOD ALIGNMENT    GOOD ALIGNMENT    **FAIR ALIGNMENT**    POOR ALIGNMENT    VERY POOR/NO ALIGNMENT

Justification:

The material is flooded with brand name of products and instrumentation. There are many instances where the brand name is not necessary ( see p. 377 Fig 13.16- cites thermocycler but does not give specific brand). When students are presented with specific brands in school they tend to connect a method with that specific company and may request the product in their lab. It may deter from the overall method of the instrument rather than the nuisances of a companies specificities.

12. D. The content of the material is representative of the discipline? (Material should include prevailing theories, concepts, standards, and models used with the subject area).

**VERY GOOD ALIGNMENT**    GOOD ALIGNMENT    FAIR ALIGNMENT    POOR ALIGNMENT    VERY POOR/NO ALIGNMENT

Justification:

Key topics of PCR, dna sequencing, strong presentation of biology, laboratory mathematics, chemistry and business as well as ethical connections to each topic.

13. D. The content of the material is factual accurate. (Materials should be free of mistakes and inconsistencies).

VERY GOOD ALIGNMENT    GOOD ALIGNMENT    **FAIR ALIGNMENT**    POOR ALIGNMENT    VERY POOR/NO ALIGNMENT

Justification:

In some cases, there are some generalizations made about lab protocol that may not necessarily be the case and could be deleted ( does not add to the value of the content). For example, p. 378- challenges of PCR... technician may spend months to optimize conditions- even with quant. limited samples or contaminated at a state forensic lab... I could not foresee a case were the funding would allow to spend a month on one sample.

**E. Currency of Content** 14. E. The content is up-to-date according to agriculture industry standards of practice.

**VERY GOOD ALIGNMENT**    GOOD ALIGNMENT    FAIR ALIGNMENT    POOR ALIGNMENT    VERY POOR/NO ALIGNMENT

Justification:

Did not find any outdated protocols, instrumentation or procedures

15. E. The content is presented to the curriculum, standards, and benchmarks in an appropriate and relevant context.

VERY GOOD ALIGNMENT    GOOD ALIGNMENT    **FAIR ALIGNMENT**    POOR ALIGNMENT    VERY POOR/NO ALIGNMENT

Justification:

Energy related standards ( 5.08, 5.09, 5.10, 28.02, 28.05) could be further development.

16. E. The content is presented in an appropriate and relevant context for the intended learners.

VERY GOOD ALIGNMENT    **GOOD ALIGNMENT**    FAIR ALIGNMENT    POOR ALIGNMENT    VERY POOR/NO ALIGNMENT

Justification:

Material contains detailed descriptions of strategies and experimental design. Side bars include regulations, bio ethics and additional research techniques.

**F. Authenticity of Content** 17. F. The content includes connections to life in a context that is meaningful to students.

**VERY GOOD ALIGNMENT**    GOOD ALIGNMENT    FAIR ALIGNMENT    POOR ALIGNMENT    VERY POOR/NO ALIGNMENT

Justification:

A strength of the text format is the developments of biotechnology in each chapter and offers relevant topics -protein analysis, cell culture, dna sequencing and the "Thinking like a biotech"- offers real world problem – solving/ case studies.

18. F. The material includes interdisciplinary connections which are intended to make the content meaningful to students.

**VERY GOOD ALIGNMENT**    GOOD ALIGNMENT    FAIR ALIGNMENT    POOR ALIGNMENT    VERY POOR/NO ALIGNMENT

Justification:

Excellent integration of laboratory mathematics in both the student text and the lab manual. Exercises such as serial dilutions and conversions are supported with narratives and detailed step by step directions.

**G. Multicultural Representation** 19. G. The portrayal of gender, ethnicity, age, work situations, cultural, religious, physical, and various social groups are fair and unbiased. (Please explain any unfair or biased portrayals in the comments section).

VERY GOOD ALIGNMENT    GOOD ALIGNMENT    FAIR ALIGNMENT    **POOR ALIGNMENT**    VERY POOR/NO ALIGNMENT

Justification:

The scientists and agents in the pictures ( hands, side images and bio of scientist) are heavily represented with Asian and white students. There is a scarcity of Hispanic and black (p.263 of text there is one of three)

**H. Humanity and Compassion** 20. H. The materials portray people and animals with compassion, sympathy, and consideration of their needs and values and exclude hard-core pornography and inhumane treatment. (An exception may be necessary for units covering animal welfare).

VERY GOOD ALIGNMENT    **GOOD ALIGNMENT**    FAIR ALIGNMENT    POOR ALIGNMENT    VERY POOR/NO ALIGNMENT

## Justification:

In some cases, pictures do not have people with appropriate level of safety wear- see p. 382 Fig 13.25- lab tech heavily gloved with open centrifuge and un sealed test tubes without eye wear. Excellent selection of appropriate but sensitive pictures of people and animals (for ex. see p. 302 & p.408) used in genetic disorder (CH 14)

21. In general, is the content of the benchmarks and standards for this course covered in the material.

VERY GOOD ALIGNMENT    **GOOD ALIGNMENT**    FAIR ALIGNMENT    POOR ALIGNMENT    VERY POOR/NO ALIGNMENT

## Justification:

Overall the student text and the lab manual provides clear and concise presentation of the content. The strength of the material is the ample examples found in the sidebar, the biotech, think like a biotech sections as well as the extension activities.

## Presentation

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**A. Comprehensiveness of Student and Teacher Resources** 1. A. The comprehensiveness of the student resources address the targeted learning outcomes without requiring the teacher to prepare additional teaching materials for the course.

VERY GOOD ALIGNMENT    **GOOD ALIGNMENT**    FAIR ALIGNMENT    POOR ALIGNMENT    VERY POOR/NO ALIGNMENT

## Justification:

Teacher course planner, with guidelines for structuring course and lesson models is very clear and the student text offers a variety of section review questions address previous section key topics.

**B. Alignment of Instructional Components** 2. B. All components of the major tool align with the curriculum and each other.

VERY GOOD ALIGNMENT    **GOOD ALIGNMENT**    FAIR ALIGNMENT    POOR ALIGNMENT    VERY POOR/NO ALIGNMENT

## Justification:

Beginning of chapter learning outcomes is matched well to course standards. Review questions in sections are a bit low however the open-ended Think like a Biotechnician assessments are at a high level of complexity.

**C. Organization of Instructional Materials** 3. C. The materials are consistent and logical organization of the content for the subject area.

VERY GOOD ALIGNMENT    **GOOD ALIGNMENT**    FAIR ALIGNMENT    POOR ALIGNMENT    VERY POOR/NO ALIGNMENT

## Justification:

The emphasis of laboratory activities and embedded safety procedures supports each detailed procedure and the step by step laboratory mathematics section ( when required) makes a solid integration of mathematics and scientific learning.

**D. Readability of Instructional Materials** 4. D. Narrative and visuals engage students in reading or listening as well as in understanding of the content at a level appropriate to the students' abilities.

VERY GOOD ALIGNMENT    **GOOD ALIGNMENT**    FAIR ALIGNMENT    POOR ALIGNMENT    VERY POOR/NO ALIGNMENT

## Justification:

Each chapter provides numerous visuals that support content examples, real world examples and uses common language terms when necessary. Also, phonetic expression of words are located in side bar with bold font and brief definitions. Below grade level readers or second language readers are supported by the variety of examples in each chapter.

**E. Pacing of Content**5. E. The amount of content presented at one time or the pace at which it is presented must be of a size or rate that allows students to perceive and understand it.

VERY GOOD ALIGNMENT    **GOOD ALIGNMENT**    FAIR ALIGNMENT    POOR ALIGNMENT    VERY POOR/NO ALIGNMENT

Justification:

Each chapter has an overall topic but each topic is fragmented to allow for instruction to move at varying paces. Teachers can differentiate the topics and offer additional extension activities to advanced students while maintaining pace of the required content for others.

**Accessibility**6. The material contains presentation, navigation, study tool and assistive supports that aid students, including those with disabilities, to access and interact with the material. (For assistance refer to the answers on the UDL questionnaire).

VERY GOOD ALIGNMENT    **GOOD ALIGNMENT**    FAIR ALIGNMENT    POOR ALIGNMENT    VERY POOR/NO ALIGNMENT

Justification:

The instructor guide with CD offers additional images that could be used for review of for visual aids to support struggling learners. Remediation and reteaching is supported by the student text with each topic including a variety of section review questions address previous section key topics.

7. In general, how well does the submission satisfy PRESENTATION requirements? (The comments should support your responses to the questions in the Presentation section).

VERY GOOD ALIGNMENT    **GOOD ALIGNMENT**    FAIR ALIGNMENT    POOR ALIGNMENT    VERY POOR/NO ALIGNMENT

Justification:

For an industrial biotechnology resource that integrates biology, chemistry, mathematics, business, and bioethics as well as specific laboratory procedures, it provides a wide variety of learning strategies for each topic that supports differentiation of instruction.

## Learning

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**A. Motivational Strategies**1. A. Instructional materials include features to maintain learner motivation.

VERY GOOD ALIGNMENT    **GOOD ALIGNMENT**    FAIR ALIGNMENT    POOR ALIGNMENT    VERY POOR/NO ALIGNMENT

Justification:

Biotech online extension and Biotech Live—hands-on or virtual lab connections is a strength of the material that provides a variety of options to the learner and can serve to motivate students of varying backgrounds to gain interest in the biotechnology industry.

**B. Teaching a Few "Big Ideas"**2. B. Instructional materials thoroughly teach a few important ideas, concepts, or themes.

VERY GOOD ALIGNMENT    **GOOD ALIGNMENT**    FAIR ALIGNMENT    POOR ALIGNMENT    VERY POOR/NO ALIGNMENT

Justification:

Key biotechnology-related topics within the areas of biology, laboratory mathematics, chemistry and business (as well as ethical connections to each topic) is clear and concise. Even with the most detailed procedures such as use of thermocyclers and PCR, the student text offers the appropriate level of details as well as overall focus and usage.

**C. Explicit Instruction**3. C. The materials contain clear statements of information and outcomes.

VERY GOOD ALIGNMENT    **GOOD ALIGNMENT**    FAIR ALIGNMENT    POOR ALIGNMENT    VERY POOR/NO ALIGNMENT

Justification:

Chapter summary concept and end of chapter " Thinking Like a Biotechnician" questions match learning outcomes align with course standards

**D. Guidance and Support**4. D. The materials provide guidance and support to help students safely and successfully become more independent learners and thinkers.

VERY GOOD ALIGNMENT    GOOD ALIGNMENT    FAIR ALIGNMENT    **POOR ALIGNMENT**    VERY POOR/NO ALIGNMENT

Justification:

A strength is the To Do (p.410) or the Biotech Online sections of each chapter (ex. p. 400). These activities directs students to "Go online and find one company..."

5. D. Guidance and support must be adaptable to developmental differences and various learning styles.

**VERY GOOD ALIGNMENT**    GOOD ALIGNMENT    FAIR ALIGNMENT    POOR ALIGNMENT    VERY POOR/NO ALIGNMENT

Justification:

The sidebar of key vocabulary terms and the end of chapter- summary concepts anchors the learning expectations of each chapter for struggling learners while the multiple activities and online extensions provides additional learning opportunities for advanced students

**E. Active Participation of Students**6. E. The materials engage the physical and mental activity of students during the learning process.

**VERY GOOD ALIGNMENT**    GOOD ALIGNMENT    FAIR ALIGNMENT    POOR ALIGNMENT    VERY POOR/NO ALIGNMENT

Justification:

Each topic has supportive visual representations, real world connections and biotech bios. The text is written with action verbs such as "Go online..." "Think about..." Explore your ideas... The embedded action verbs of the student text and lab manual calls for the student to be engaged rather than a passive learner of the material

7. E. Rate how well the materials include organized activities that are logical extensions of content, goals, and objectives.

VERY GOOD ALIGNMENT    GOOD ALIGNMENT    **FAIR ALIGNMENT**    POOR ALIGNMENT    VERY POOR/NO ALIGNMENT

Justification:

The main concern is that colored font of sections at times is not clear. for example, p. 23- the Review questions and the next section 1.5 is the same color but the content for the section matches the content for the previous section to green. Where a subtopic begins and ends is somewhat confusing

**F. Targeted Instructional Strategies**8. F. Instructional materials include the strategies known to be successful for teaching the learning outcomes targeted in the curriculum requirements.

**VERY GOOD ALIGNMENT**    GOOD ALIGNMENT    FAIR ALIGNMENT    POOR ALIGNMENT    VERY POOR/NO ALIGNMENT

Justification:

Science content, lab activities, math exercises and supportive bioethics, business and manufacturing concepts are well connected.

9. F. The instructional strategies incorporated in the materials are effective in teaching the targeted outcomes.

**VERY GOOD ALIGNMENT**    GOOD ALIGNMENT    FAIR ALIGNMENT    POOR ALIGNMENT    VERY POOR/NO ALIGNMENT

Justification:

Science topic background for each biotechnology concept is relevant and makes a strong connection to each topic. The mathematics for specific calculations is presented in a logical framework with clear directives.

**G. Targeted Assessment Strategies**10. G. The materials correlate assessment strategies to the desired learning outcomes.

VERY GOOD ALIGNMENT    **GOOD ALIGNMENT**    FAIR ALIGNMENT    POOR ALIGNMENT    VERY POOR/NO ALIGNMENT

Justification:

The review questions for chapter sections is at a low level. However, the end of chapter "Think like a Biotechnician" questions are at the appropriate level of complexity for each learning standard however the review questions of each section is at a low level

11. G. the assessment strategies incorporated in the materials are effective in assessing the learners' performance with regard to the targeted outcomes.

VERY GOOD ALIGNMENT    **GOOD ALIGNMENT**    FAIR ALIGNMENT    POOR ALIGNMENT    VERY POOR/NO ALIGNMENT

Justification:

The strength of the material is the Biotech live Activities which allows students to use key terms, learning concepts to real world relevant applications. These open-ended activities are high yielding strategies which requires students to master both content and practical applications.

**Universal Design for Learning**12. This submission incorporates strategies, materials, activities, etc., that consider the needs of all students.

VERY GOOD ALIGNMENT    **GOOD ALIGNMENT**    FAIR ALIGNMENT    POOR ALIGNMENT    VERY POOR/NO ALIGNMENT

Justification:

Key terms, review sections, visuals, online supportive exercises, extension activities provides instructors a variety of ways to accommodate all learners.

13. In general, does the submission satisfy LEARNING requirements? (The comments should support your responses to the questions in the Learning section.)

VERY GOOD ALIGNMENT    **GOOD ALIGNMENT**    FAIR ALIGNMENT    POOR ALIGNMENT    VERY POOR/NO ALIGNMENT

Justification:

The learning outcomes at the beginning of each chapter matches to the level of the course standards. The additional activities, online resources and lab practice opportunities is the strength of the resource to differentiate for all learners to be master the standards and assess their understanding in a variety of ways.

If you have questions contact Office of Instructional Materials, [instaff@fldoe.org](mailto:instaff@fldoe.org) or 850-245-0425

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